

RECRUITING AND RETAINING FEMALES IN TECHNICAL FIELDS

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You can be anything!



If you were a high school girl watching this video what would your reaction be?

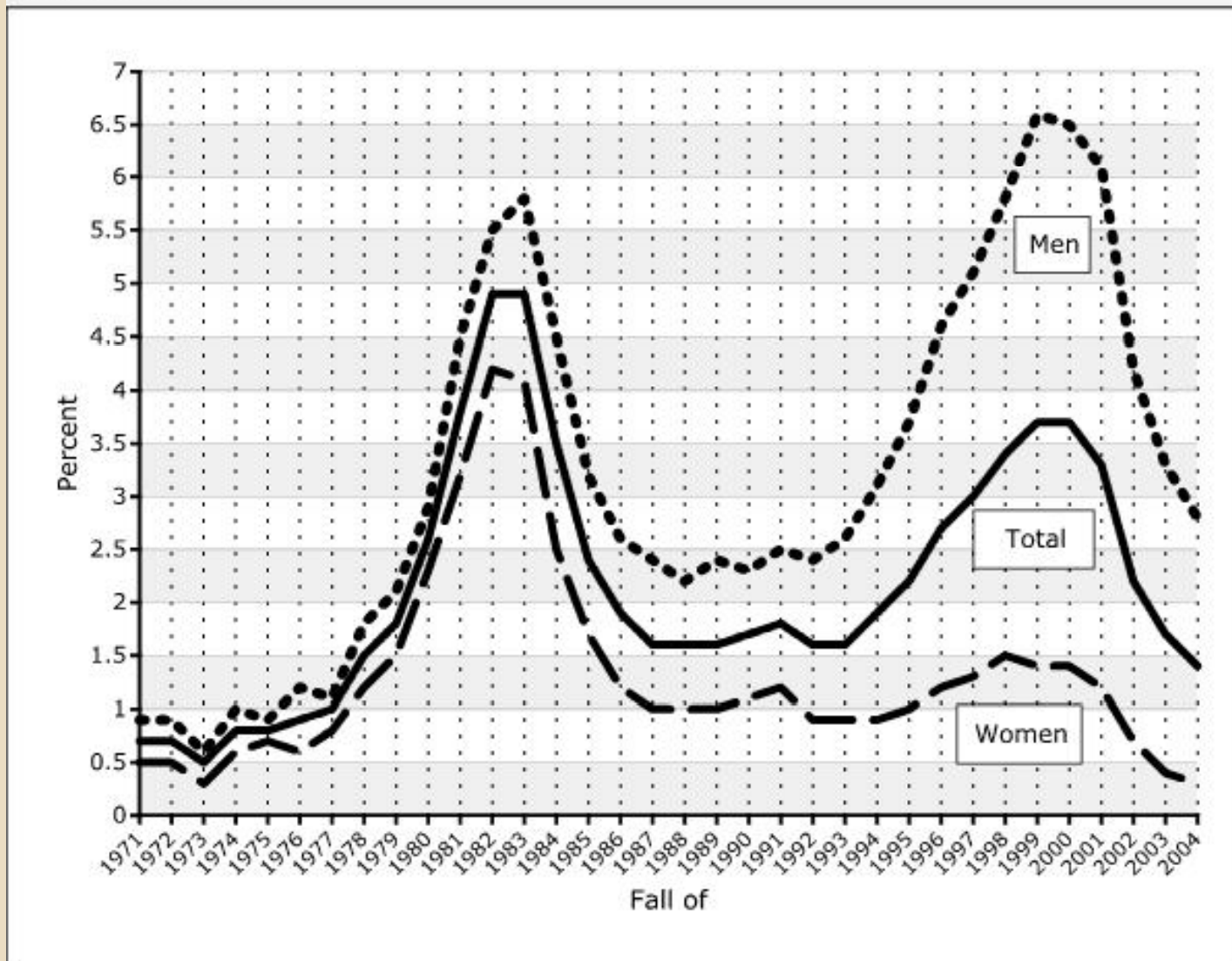
10 min. – Break into groups into each other and answer the question—give them white boards and markers

5-8 min. – Share what is on the boards (Why the boards—hear all the voices, if I just let you start talking some would lose their nerve if their opinion was significantly different than the class.)

Recruiting is crucial!

- The National Center for Women and Information Technology reports that of the SAT takers who intend to major in computer and information sciences, the proportion of girls has steadily decreased relative to the proportion of boys, from 20 percent in 2001 to 12 percent in 2006.
<http://www.ncwit.org/>

Figure 1. Computer Science Listed as Probable Major Among Incoming Freshmen
Source: HERI at UCLA



What can we do?

- Audiences?
- Who is recruiting?
- How?

18 year olds

- NMSU Middle School day was a wonderful effort
 - ▣ Hands-on cable – Google Earth, Google Moon, The Day You Were Born
- Career days
 - ▣ Let them see who we are – rock crawlers, grandma, BB Gun at Vista
- Science fair projects – Zia
 - ▣ Parents in classrooms (WSMR off Fridays)
- WiT HS Day
- WiT in classroom
- Onate principal – to parents
- Jennifer – to counselors, teachers, etc.
 - ▣ NASA's teacher fellowship
 - ▣ LCPS letting teachers work for Tech Support over summer



NMSU | DOÑA ANA COMMUNITY COLLEGE

Girls, get started on a career in
computers, engineering, or technology!



DACC's Women in Technology invites
high school senior girls to
High School Day

Fri., Feb. 8, 2008 9 a.m. to 2 p.m.

DACC East Mesa Campus
2800 N. Sonoma Ranch Blvd.

Learn more about NASA, Microsoft®, Intel®, and Cisco®!



Sign up in your high school counseling office.

Call 528-7215 for more details.

20- ??? Year olds

- When life doesn't work out. . .
- CS 110 (core classes). COMM 265
 - ▣ Back of book
 - ▣ Guest Speakers
- Career Fair last year
- Tech support for Border learning etc.
- Monthly Lunches
 - ▣ In commons area
- Advisory Council – community
 - ▣ They have to get comfortable with females (ME)



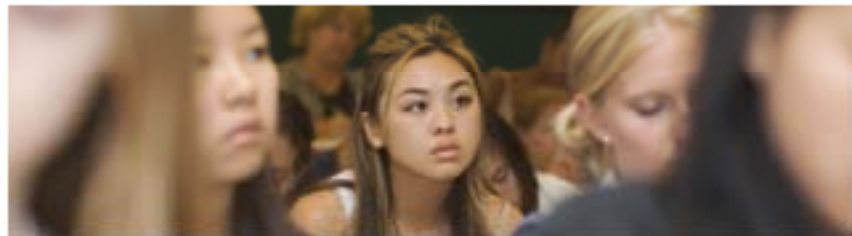
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**Ladies, you're invited to a
Women in Technology
Luncheon**

**Friday, Feb. 15, 2008
12-1 p.m.**

**In the East Mesa downstairs
Conference room
(just inside the 100 office area)**



Call Donna Saulsberry at 528-7215 for more details.

What can we do?

- Audiences?
 - 18-20 or 20+
- Who is recruiting?
 - Advisors, Student Services reps, Faculty, Students
- How?
 - Posters, Ads, Career Fairs, HS Recruiting days, Student organizations

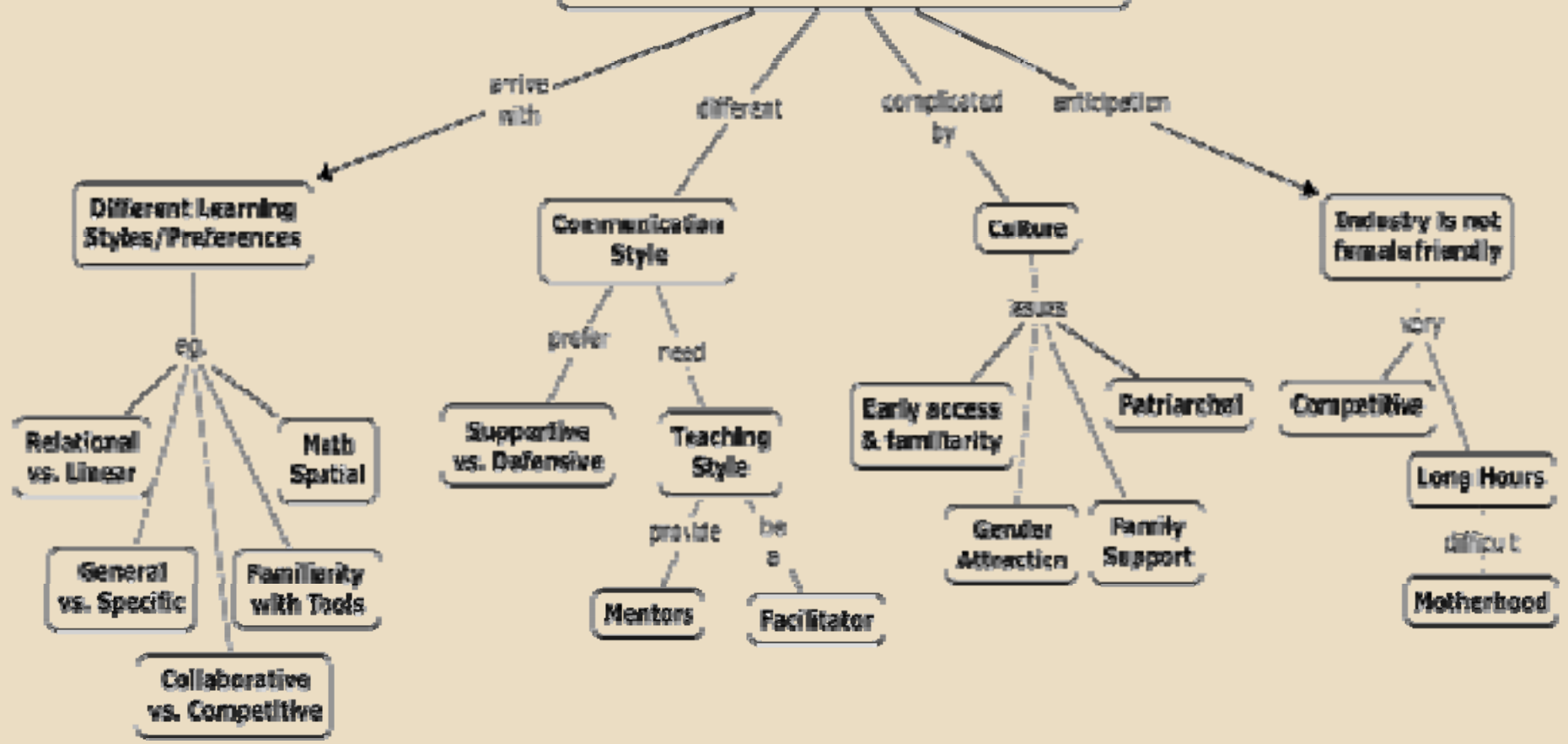
Retention



Educated in Romance

- “As we followed the women’s experiences during the period of our study, we found that the peer system promoted and propelled the women into a world of romance in which their attractiveness to men counted most. The women were subjected to a ‘sexual auction block.’ In the shadow of the peer society, academics commanded only limited attention. The women were more or less left on their own by the university, by their peers, and to a lesser extent by their parents, to develop—or not—careers, to prepare themselves—or not—as future breadwinners.” (Holland and Eisenhart, 1990, p. 8)
- Groups again – what do you think. Other reasons females may not persist (white boards again)

Retaining Females In Computer Fields



Adapted from:

**Achieving Gender Equity in
Science Classrooms**

A Guide for Faculty

**Compiled by Women Science Students
and Science Faculty and Staff at
NECUSE* Colleges and Based Upon
Initial Work by Students at Brown
University.**

* New England Consortium for Undergraduate Science Education

Observe Classroom Dynamics

- Men tend to respond to questions more confidently, aggressively, and quickly, regardless of the quality of their responses; they tend to speak more freely and spontaneously in class, formulating their answers as they speak.
- Women, on the other hand, tend to wait longer to respond to a question in class, choosing their words carefully, reflecting on the question and constructing an answer before they speak.
- Women also tend to be interrupted more frequently than men; when this happens, they get the message that their contributions are not as valuable, and they may hesitate to join discussions in the future.

Recommendations

- **Encourage class participation: Allow a wait time before choosing someone to answer a question.** Studies have shown that by waiting another two or three seconds, uncomfortable though it seems at first, it is possible to encourage more students to participate in questions and answers.
- **Whom do you call upon? Be aware of whom you are calling upon, and how you respond to their questions and answers.** Studies have shown that lecturers tend to call on men more frequently than they call on women, and that they react more positively to the responses of men, including coaching their answers. Self monitor, or have someone else monitor the number of men, women, and people of color who speak in your class.
- **Seek outside feedback: Ask someone from your college's education, communication, speech, or theater departments or the college teaching center to observe your class and give you feedback about lecture style and the dynamics of the classroom.** It is difficult when lecturing to concentrate on the content, delivery and patterns of interactions with students. A trained observer can give you valuable feedback about ways to include and encourage all students. Another way to monitor your teaching is to videotape yourself during class and then review the tape later.
- **Monitor language and materials: Use gender neutral language, refer to female as well as male scientists, and attempt to learn students' names.** Include material that reinforces your support of women in science, whether it is a journal, a magazine or a book on gender and science research.

Be a Professor Who Cares

- In a study of "Student Perceptions of Problems In Undergraduate Teaching Methods by Sex" (Hewitt 1991), thirty percent of women surveyed listed "professors don't care about you" as a problem, but no men listed this as a problem.
- Students were also asked to give characteristics of a good professor. Many women replied that a good professor was approachable, friendly, and wanted to know the students (Seymour 1992b).

Recommendations

- **Arrive 10-15 min. early and greet the students by name as they arrive**
- **Use email to provide them with personal communication on a frequent basis**
- **Provide other opportunities for the students to meet outside of the classroom:** Consider inviting small classes to your home or to a restaurant for discussions about their field or for a discussion section of the class. This provides students with the opportunity to get to know each other as well as the professor in a more informal environment.

Recommendations continued

- **Require a student visit**
- **Leave the door open:** Leave your door open, literally. Sexual harassment is of real concern to women in technology and science; it is important to create an environment of mutual respect, free from intimidation and bias. Leaving your door open sends a message that the conversation is not private or of a personal nature. Let the student decide when to shut the door as it is sometimes appropriate to discuss test scores or course standing in private.
- Also, arriving at a closed door during "open hours" may make students feel that they are interrupting you, even when they arrive during office hours.

Personalize Large Classes

- When students were asked what they disliked about large classes, women tended to respond that such courses were impersonal, that the professor didn't know who they were, and that they felt isolated.

Recommendations

- **Encourage the use of study groups:** "Cooperative small group work is a more effective strategy both for achievement and motivation" (Gardner et al. 1989). By cutting down on the competitiveness in a class and encouraging cooperation, study groups can be especially beneficial to women. "A necessary element for women's success in engineering programs at Massachusetts Institute of Technology was providing a peer group or team with whom they could cooperate" (Dresselhaus 1987).

Recommendations continued

- **Create a better sense of community**
- **Use more written exercises**
- **Rearrange the classroom setting**
- **Use a course management system such as WebCT or Blackboard:** Start up an electronic discussion list. Make it possible for students to ask anonymous questions.

Shift From A Competitive to a Cooperative Educational Model

- It is a common belief among first-year students that introductory science classes are "weedouts," and that such courses are designed to eliminate those students in the class who are not deemed "fit" to be in science or technology. The perception of a "weeding out" atmosphere discourages many interested students from pursuing technology or science in college.
- Some faculty members believe that "a lack of certain attributes of ability and/or character distinguishes those who leave technical majors from those who remain in them. Widespread acceptance of this theory allows technical schools and departments ... to regard their leaving as a kind of 'natural selection' process"

Recommendations

- **Address the weedout theory**
- **Change the grading system:** Do not grade on a curve.
- **Address grade anxieties:** Stress that performance in introductory courses is not necessarily an indicator of future performance or ability. Students must be aware that low grades in introductory courses can be the result of a combination of reasons -- such as a weak high school background or difficulty in making the transition to the college environment -- many of which may have nothing to do with ability.
- **Utilize cooperative and collaborative work**

Encourage Active Participation in Labs

- Women tend to be more passive in labs at coed colleges.

Recommendations:

- **Divide lab roles:** Assign roles (such as note-taking and taking measurements) to each member of a lab group and rotate the roles.
- **Emphasize lab/classroom connection:** The correlation between what is learned in lecture and what is to be carried out in lab should be stressed by the professors and the teaching assistants.
- **Provide an open-ended structure:** Give introductory labs a more open-ended structure. The student is forced to think about the lab rather than follow "canned" instructions to already known answers. Emphasize the path to the solution, not just the final answer, and encourage students to share the diverse paths they have taken to get to solution.
- **Have students design labs**

Provide Diverse Role Models

- Women need exposure to male and female mentors. Many undergraduates and women in technology and science cite the importance of their male role models or mentors in assisting them in their pursuit of a science career. While men have been important colleagues, advocates, role models, and mentors for women, women students also need exposure to women who are successful in STEM fields.
- It is still a long held belief that, The 'old boy network' which draws promising male students into research projects and mentored relationships with faculty ... tends to exclude women (Seymour 1992b).
- In addition, there are a lack of female and male role models in technology and science who have successfully balanced work and outside interests. Often college women are thinking ahead to their hopes for children and a family, but cannot find many role models who are women and mothers, and who manage to balance the needs of both job and family life. More and more undergraduates, both men and women, are looking for examples of professionals who pursue interests outside of work without sacrificing their careers.

Recommendations

- **Female faculty:** Ultimately, the best solution is to hire -- and retain -- female faculty who can serve as role models. Women faculty members who have families can also choose to share their stories about balancing work and family. "The faculty are very important in creating an environment that is supportive of women students" (Finholt 1990).
- **Guest lecturers:** Professors can provide role models for students by bringing guest lecturers to class to talk about their experiences or to give a lecture in their field of expertise (NRC 1991). Female scientists, including post-docs and graduate students from other universities, government and industry, can be invited to give colloquia as part of a department's regular colloquium series.
- **Acknowledge women's contributions to technology and science:** Mention the contributions of both female and male scientists when appropriate. Instead of simply mentioning a scientist's last name, include the first names of women scientists so that students do not assume you are referring to a man.
- **Act as a role model and mentor:**